SEQUENCE LISTING

<110> INSERM

<120> A vaccine composition comprising an immunoadjuvant compound consisting of a Rho GTPase family activator

<130> Q971EP

<160> 9

<170> PatentIn version 3.1

<210> 1
<211> 1014
<212> PRT
<213> Escherichia coli

<400> 1

Met Gly Asn Gln Trp Gln Gln Lys Tyr Leu Leu Glu Tyr Asn Glu Leu
1   5   10   15

Val Ser Asn Phe Pro Ser Pro Glu Arg Val Val Ser Asp Tyr Ile Lys
            20   25   30

Asn Cys Phe Lys Thr Asp Leu Pro Trp Phe Ser Arg Ile Asp Pro Asp
        35   40   45

Asn Ala Tyr Phe Ile Cys Phe Ser Gln Asn Arg Ser Asn Ser Arg Ser
    50   55   60

Tyr Thr Gly Trp Asp His Leu Gly Lys Tyr Lys Thr Glu Val Leu Thr
65   70   75   80

Leu Thr Gln Ala Ala Leu Ile Asn Ile Gly Tyr Arg Phe Asp Val Phe
                85   90   95

Asp Asp Ala Asn Ser Ser Thr Gly Ile Tyr Lys Thr Lys Ser Ala Asp
            100   105   110

Val Phe Asn Glu Glu Asn Glu Glu Lys Met Leu Pro Ser Glu Tyr Leu
            115   120   125

His Phe Leu Gln Lys Cys Asp Phe Ala Gly Val Tyr Gly Lys Thr Leu
    130   135   140

Ser Asp Tyr Trp Ser Lys Tyr Tyr Asp Lys Phe Lys Leu Leu Leu Lys
145   150   155   160

Asn Tyr Tyr Ile Ser Ser Ala Leu Tyr Leu Tyr Lys Asn Gly Glu Leu

                    165   170   175

Asp Glu Arg Glu Tyr Asn Phe Ser Met Asn Ala Leu Asn Arg Ser Asp
            180   185   190

Asn Ile Ser Leu Leu Phe Phe Asp Ile Tyr Gly Tyr Tyr Ala Ser Asp
            195   200   205

Ile Phe Val Ala Lys Asn Asn Asp Lys Val Met Leu Phe Ile Pro Gly
210   215   220

Ala Lys Lys Pro Phe Leu Phe Lys Lys Asn Ile Ala Asp Leu Arg Leu
225   230   235   240

Thr Leu Lys Glu Leu Ile Lys Asp Ser Asp Lys Gln Gln Leu Leu Ser
                245   250   255

Gln His Phe Ser Leu Tyr Ser Arg Gln Asp Gly Val Ser Tyr Ala Gly
            260   265   270

Val Asn Ser Val Leu His Ala Ile Glu Asn Asp Gly Asn Phe Asn Glu
            275   280   285

Ser Tyr Phe Leu Tyr Ser Asn Lys Thr Leu Ser Asn Lys Asp Val Phe
            290   295   300

Asp Ala Ile Ala Ile Ser Val Lys Lys Arg Ser Phe Ser Asp Gly Asp
305   310   315   320

Ile Val Ile Lys Ser Asn Ser Glu Ala Gln Arg Asp Tyr Ala Leu Thr
                325   330   335

Ile Leu Gln Thr Ile Leu Ser Met Thr Pro Ile Phe Asp Ile Val Val
                340   345   350

Pro Glu Val Ser Val Pro Leu Gly Leu Gly Ile Ile Thr Ser Ser Met
            355   360   365

Gly Ile Ser Phe Asp Gln Leu Ile Asn Gly Asp Thr Tyr Glu Glu Arg
            370   375   380

Arg Ser Ala Ile Pro Gly Leu Ala Thr Asn Ala Val Leu Leu Gly Leu
385   390   395   400

Ser Phe Ala Ile Pro Leu Leu Ile Ser Lys Ala Gly Ile Asn Gln Glu
                405   410   415

Val Leu Ser Ser Val Ile Asn Asn Glu Gly Arg Thr Leu Asn Glu Thr
        420   425   430

Asn Ile Asp Ile Phe Leu Lys Glu Tyr Gly Ile Ala Glu Asp Ser Ile
        435   440   445

Ser Ser Thr Asn Leu Leu Asp Val Lys Leu Lys Ser Ser Gly Gln His
450   455   460

Val Asn Ile Val Lys Leu Ser Asp Glu Asp Asn Gln Ile Val Ala Val
465   470   475   480

Lys Gly Ser Ser Leu Ser Gly Ile Tyr Tyr Glu Val Asp Ile Glu Thr
                485   490   495

Gly Tyr Glu Ile Leu Ser Arg Arg Ile Tyr Arg Thr Glu Tyr Asn Asn
        500   505   510

Glu Ile Leu Trp Thr Arg Gly Gly Gly Leu Lys Gly Gly Gln Pro Phe
        515   520   525

Asp Phe Glu Ser Leu Asn Ile Pro Val Phe Phe Lys Asp Glu Pro Tyr
        530   535   540

Ser Ala Val Thr Gly Ser Pro Leu Ser Phe Ile Asn Asp Asp Ser Ser
545   550   555   560

Leu Leu Tyr Pro Asp Thr Asn Pro Lys Leu Pro Gln Pro Thr Ser Glu
                565   570   575

Met Asp Ile Val Asn Tyr Val Lys Gly Ser Gly Ser Phe Gly Asp Arg
            580   585   590

Phe Val Thr Leu Met Arg Gly Ala Thr Glu Glu Glu Ala Trp Asn Ile
        595   600   605

Ala Ser Tyr His Thr Ala Gly Gly Ser Thr Glu Glu Leu His Glu Ile
        610   615   620

Leu Leu Gly Gln Gly Pro Gln Ser Ser Leu Gly Phe Thr Glu Tyr Thr
625   630   635   640

Ser Asn Val Asn Ser Ala Asp Ala Ala Ser Arg Arg His Phe Leu Val
                645   650   655

Val Ile Lys Val His Val Lys Tyr Ile Thr Asn Asn Asn Val Ser Tyr
          660   665   670

Val Asn His Trp Ala Ile Pro Asp Glu Ala Pro Val Glu Val Leu Ala
          675   680   685

Val Val Asp Arg Arg Phe Asn Phe Pro Glu Pro Ser Thr Pro Pro Asp
          690   695   700

Ile Ser Thr Ile Arg Lys Leu Leu Ser Leu Arg Tyr Phe Lys Glu Ser
705   710   715   720

Ile Glu Ser Thr Ser Lys Ser Asn Phe Gln Lys Leu Ser Arg Gly Asn
              725   730   735

Ile Asp Val Leu Lys Gly Arg Gly Ser Ile Ser Ser Thr Arg Gln Arg
          740   745   750

Ala Ile Tyr Pro Tyr Phe Glu Ala Ala Asn Ala Asp Glu Gln Gln Pro
          755   760   765

Leu Phe Phe Tyr Ile Lys Lys Asp Arg Phe Asp Asn His Gly Tyr Asp
          770   775   780

Gln Tyr Phe Tyr Asp Asn Thr Val Gly Leu Asn Gly Ile Pro Thr Leu
785   790   795   800

Asn Thr Tyr Thr Gly Glu Ile Pro Ser Asp Ser Ser Ser Leu Gly Ser
              805   810   815

Thr Tyr Trp Lys Lys Tyr Asn Leu Thr Asn Glu Thr Ser Ile Ile Arg
              820   825   830

Val Ser Asn Ser Ala Arg Gly Ala Asn Gly Ile Lys Ile Ala Leu Glu
          835   840   845

Glu Val Gln Glu Gly Lys Pro Val Ile Ile Thr Ser Gly Asn Leu Ser
          850   855   860

Gly Cys Thr Thr Ile Val Ala Arg Lys Glu Gly Tyr Ile Tyr Lys Val
865   870   875   880

His Thr Gly Thr Thr Lys Ser Leu Ala Gly Phe Thr Ser Thr Thr Gly
              885   890   895

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Val Lys Lys Ala Val Glu Val Leu Glu Leu Leu Thr Lys Glu Pro Ile
        900             905             910

Pro Arg Val Glu Gly Ile Met Ser Asn Asp Phe Leu Val Asp Tyr Leu
        915             920             925

Ser Glu Asn Phe Glu Asp Ser Leu Ile Thr Tyr Ser Ser Ser Glu Lys
        930             935             940

Lys Pro Asp Ser Gln Ile Thr Ile Ile Arg Asp Asn Val Ser Val Phe
945             950             955             960

Pro Tyr Phe Leu Asp Asn Ile Pro Glu His Gly Phe Gly Thr Ser Ala
            965             970             975

Thr Val Leu Val Arg Val Asp Gly Asn Val Val Val Arg Ser Leu Ser
        980             985             990

Glu Ser Tyr Ser Leu Asn Ala Asp Ala Ser Glu Ile Ser  Val Leu Lys
        995             1000            1005

Val Phe  Ser Lys Lys Phe
    1010
```

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<210>  2
<211>  1014
<212>  PRT
<213>  Escherichia coli

<400>  2
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Met Asn Val Gln Trp Gln Gln Lys Tyr Leu Leu Glu Tyr Asn Glu Leu
1           5               10              15

Val Ser Asn Phe Pro Ser Pro Glu Arg Val Val Ser Asp Tyr Ile Arg
        20              25              30

Arg Cys Phe Lys Thr Asp Leu Pro Trp Phe Ser Gln Val Asp Pro Asp
        35              40              45

Asn Thr Tyr Phe Ile Arg Phe Ser Gln Ser Arg Ser Asn Ser Arg Ser
    50              55              60

Tyr Thr Gly Trp Asp His Leu Gly Lys Tyr Lys Thr Gly Val Leu Thr
65              70              75              80

Leu Thr Gln Ala Ala Leu Ile Asn Ile Gly Tyr His Phe Asp Val Phe
            85              90              95
```

Asp Asp Ala Asn Ala Ser Ala Gly Ile Tyr Lys Thr Ser Ser Ala Asp
        100   105   110

Met Phe Asn Glu Lys Asn Glu Glu Lys Met Leu Pro Ser Glu Tyr Leu
        115   120   125

Tyr Phe Leu Lys Gly Cys Asp Phe Ser Gly Ile Tyr Gly Arg Phe Leu
    130   135   140

Ser Asp Tyr Trp Ser Lys Tyr Tyr Asp Lys Phe Lys Leu Leu Leu Lys
145   150   155   160

Asn Tyr Tyr Ile Ser Ser Ala Leu Tyr Leu Tyr Lys Asn Gly Glu Ile
                165   170   175

Asp Glu Tyr Glu Tyr Asn Phe Ser Ile Ser Ala Leu Asn Arg Arg Asp
            180   185   190

Asn Ile Ser Leu Phe Phe Phe Asp Ile Tyr Gly Tyr Tyr Ser Ser Asp
        195   200   205

Met Phe Val Ala Lys Asn Asn Glu Arg Val Met Leu Phe Ile Pro Gly
    210   215   220

Ala Lys Lys Pro Phe Leu Phe Glu Lys Asn Ile Ala Asp Leu Arg Ile
225   230   235   240

Ser Leu Lys Asn Leu Ile Lys Glu Asn Asp Asn Lys Gln Leu Leu Ser
                245   250   255

Gln His Phe Ser Leu Tyr Ser Arg Gln Asp Gly Ile Thr Tyr Ala Gly
            260   265   270

Val Asn Ser Val Leu Asn Ala Ile Glu Asn Asp Gly Val Phe Asn Glu
        275   280   285

Ser Tyr Phe Leu Tyr Ser Asn Lys Arg Ile Asn Asn Lys Asp Val Phe
    290   295   300

Asp Ala Val Ala Phe Ser Val Lys Lys Arg Ser Phe Ser Asp Gly Asp
305   310   315   320

Ile Val Ile Lys Ser Asn Ser Glu Ala Gln Arg Asp Tyr Ala Leu Thr
                325   330   335

```
Ile Leu Gln Thr Ile Leu Ser Met Thr Pro Ile Phe Asp Val Ala Ile
        340             345             350

Pro Glu Val Ser Val Thr Leu Gly Leu Gly Ile Ile Ala Ser Ser Met
        355             360             365

Gly Ile Ser Phe Asp Gln Leu Ile Asn Gly Asp Thr Tyr Glu Glu Arg
    370             375             380

Arg Ser Ala Ile Pro Gly Leu Ala Thr Asn Ala Ala Leu Leu Gly Leu
385             390             395             400

Ser Phe Ala Ile Pro Phe Leu Ile Ser Lys Ala Gly Thr Asn Gln Lys
            405             410             415

Ile Leu Ser Arg Tyr Thr Lys His Glu Ile Arg Thr Leu Asn Glu Thr
            420             425             430

Asn Ile Asp Met Phe Leu Glu Glu Tyr Gly Ile Asn Lys Asn Ser Ile
        435             440             445

Ser Glu Thr Lys Val Leu Glu Val Glu Leu Lys Gly Ser Gly Gln His
    450             455             460

Val Asn Ile Val Lys Leu Ser Asp Glu Asp Asn Lys Ile Val Ala Val
465             470             475             480

Lys Gly Asn Ser Leu Ser Gly Ile Tyr Tyr Glu Val Asp Ile Glu Thr
            485             490             495

Gly Tyr Glu Ile Ser Ser Arg Arg Ile Tyr Arg Thr Glu Tyr Asn Asp
        500             505             510

Lys Ile Phe Trp Thr Arg Gly Gly Gly Leu Lys Gly Gly Gln Ser Phe
        515             520             525

Asp Phe Glu Ser Leu Lys Leu Pro Ile Phe Phe Lys Asp Glu Pro Tyr
    530             535             540

Ser Ala Val Pro Gly Ser Ser Leu Ser Phe Ile Asn Asp Asp Ser Ser
545             550             555             560

Leu Leu Tyr Pro Asn Ser Thr Pro Lys Leu Pro Gln Pro Thr Pro Glu
            565             570             575
```

```
Met Glu Ile Val Asn Tyr Val Lys Arg Ala Gly Asn Phe Gly Glu Arg
        580                  585              590


Leu Val Thr Leu Met Arg Gly Thr Thr Glu Glu Glu Ala Trp Asn Ile
        595              600              605


Ala Arg Tyr His Thr Ala Gly Gly Ser Thr Glu Glu Leu His Glu Ile
    610              615              620


Leu Leu Gly Gln Gly Pro Gln Ser Ser Leu Gly Phe Thr Glu Tyr Thr
625              630              635              640


Ser Asn Ile Asn Ser Ala Asp Ala Ala Ser Arg Arg His Phe Leu Val
            645              650              655


Val Ile Lys Val Gln Val Lys Tyr Ile Asn Asn Asn Val Ser His
        660              665              670


Val Asn His Trp Ala Ile Pro Asp Glu Ala Pro Val Glu Val Leu Ala
        675              680              685


Val Val Asp Arg Arg Phe Asn Phe Pro Glu Pro Ser Thr Pro Pro Asn
    690              695              700


Ile Ser Ile Ile His Lys Leu Leu Ser Leu Arg Tyr Phe Lys Glu Asn
705              710              715              720


Ile Glu Ser Thr Ser Arg Leu Asn Leu Gln Lys Leu Asn Arg Gly Asn
            725              730              735


Ile Asp Ile Phe Lys Gly Arg Gly Ser Ile Ser Ser Thr Arg Gln Arg
            740              745              750


Ala Ile Tyr Pro Tyr Phe Glu Ser Ala Asn Ala Asp Glu Gln Gln Pro
        755              760              765


Val Phe Phe Tyr Ile Lys Lys Asn Arg Phe Asp Asp Phe Gly Tyr Asp
        770              775              780


Gln Tyr Phe Tyr Asn Ser Thr Val Gly Leu Asn Gly Ile Pro Thr Leu
785              790              795              800


Asn Thr Tyr Thr Gly Glu Ile Leu Ser Asp Ala Ser Ser Leu Gly Ser
            805              810              815


Thr Tyr Trp Lys Lys Tyr Asn Leu Thr Asn Glu Thr Ser Ile Ile Arg
```

```
                820                825              830

Val Ser Asn Ser Ala Arg Gly Ala Asn Gly Ile Lys Ile Ala Leu Glu
        835             840          .     845


Glu Val Gln Glu Gly Lys Pro Val Ile Ile Thr Ser Gly Asn Leu Ser
    850             855             860


Gly Cys Thr Thr Ile Val Ala Arg Lys Gly Gly Tyr Leu Tyr Lys Val
865             870             875                     880


His Thr Gly Thr Thr Ile Pro Leu Ala Gly Phe Thr Ser Thr Thr Gly
                885     /         890             895


Val Lys Lys Ala Val Glu Val Phe Glu Leu Leu Thr Asn Asn Pro Met
        900             905             910


Pro Arg Val Glu Gly Val Met Asn Asn Asp Phe Leu Val Asn Tyr Leu
        915             920             925


Ala Glu Ser Phe Asp Glu Ser Leu Ile Thr Tyr Ser Ser Ser Glu Gln
    930             935             940


Lys Ile Gly Ser Lys Ile Thr Ile Ser Arg Asp Asn Val Ser Thr Phe
945             950             955                     960


Pro Tyr Phe Leu Asp Asn Ile Pro Glu Lys Gly Phe Gly Thr Ser Val
            965             970             975


Thr Ile Leu Val Arg Val Asp Gly Asn Val Ile Val Lys Ser Leu Ser
            980             985             990


Glu Ser Tyr Ser Leu Asn Val Glu  Asn Ser Asn Ile Ser  Val Leu His
        995             1000            1005


Val Phe  Ser Lys Asp Phe
    1010
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<210> 3
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<212> PRT
<213> Yersinia pseudotuberculosis

<400> 3

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Met Lys Asn Gln Trp Gln His Gln Tyr Phe Leu Ser Tyr Ser Glu Leu
1               5               10              15
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Val Ala Asn Phe Pro Ser Pro Glu Lys Val Val Ser Asp Tyr Ile Lys
            20   25   30

His Lys Phe Ser Thr Thr Leu Pro Trp Phe Gly Trp Ala Asp Pro Asp
            35   40   45

Asn Leu Tyr Phe Ile Arg Phe Thr Gln Ser Arg Ser Asn Asn Lys Ser
    50   55   60

Tyr Thr Gly Trp Asp His Leu Gly Lys Tyr Ala Ile Glu Thr Leu Thr
65   70   75   80

Leu Thr Gln Ala Ala Ile Val Asn Ile Gly Ser Arg Phe Asp Ile Phe
            85   90   95

Asp Glu Ala Asn Ser Thr Ala Gly Ile Tyr Lys Thr Asn Asn Ala Asp
            100   105   110

Ser Phe Asp Glu Thr Asn Glu Ala Lys Met Leu Pro Ser Glu Tyr Leu
            115   120   125

Tyr Phe Leu Arg Asp Cys Asp Phe Ser Asn Leu Tyr Asn Lys Ala Leu
    130   135   140

Ser Asp Tyr Trp Ala Glu Asn Tyr Glu Lys Phe Ser Thr Leu Leu Gln
145   150   155   160

Asn Tyr Tyr Ile Ser Ser Ala Tyr Tyr Leu Tyr Lys Asp Ser Ala Ile
            165   170   175

Ser Lys Asp Glu Tyr Glu Phe Ser Ile Asp Ala Ile Phe Asn Lys Lys
            180   185   190

Ser Lys Ile Leu Arg Tyr Tyr Phe Asp Val Tyr Gly Tyr Tyr Ser Ser
            195   200   205

Asp Met Phe Val Ala Met Asn Asp Asn Lys Thr Met Leu Phe Ile Pro
    210   215   220

Gly Ala Thr Asn Pro Phe Ile Phe Ala Asp Asn Ile Thr Asp Leu Arg
225   230   235   240

Asp Lys Ile Lys Ala Leu Ile Ser Asp Lys Asn Thr Arg Glu Leu Phe
            245   250   255

Ser Lys His Phe Ser Leu Tyr Asp Arg Gln Asp Gly Asn Thr Tyr Leu
        260   265   270

Gly Val Asn Ser Met Leu Glu Gln Ile Val Ser Gly Val Val Asp Thr
        275   280   285

Asn Tyr Ile Met Tyr Ser Asn Lys Asn Ile Arg Glu Arg Asn Val Phe
    290   295   300

Gly Ser Met Ala Phe Ser Thr Arg Glu Arg Ser Phe Asn Asp Gly Asp
305   310   315   320

Val Ile Ile Lys Ser Asn Ala Glu Val Gln Arg Asp Tyr Ala Leu Asn
            325   330   335

Val Leu Gln Thr Ile Leu Ser Leu Ser Pro Ile Phe Asp Ile Val Leu
            340   345   350

Pro Glu Val Ser Ile Pro Ile Ser Leu Gly Ile Thr Ala Ser Ser Val
        355   360   365

Gly Ile Ser Phe Asp Glu Leu Ile Asn Gly Asp Thr Tyr Glu Glu Arg
    370   375   380

Arg Ser Ala Ile Pro Gly Leu Ala Thr Asn Thr Val Leu Leu Gly Ile
385   390   395   400

Ser Phe Ala Ile Pro Phe Leu Ile Ser Lys Ala Glu Glu Asn Lys Leu
            405   410   415

Ile Ile Asn Asn Leu Val Gly Ser Asp Glu Asn Ile Leu Asn Lys Asn
            420   425   430

Asn Leu Gly Asp Phe Leu Glu Lys Tyr Asn Ile Ser Glu Ser Asp Ile
        435   440   445

Pro Glu Asn Gly Ser Leu Val Ile Asn Leu Lys Asn Thr Asn Val Pro
    450   455   460

Val Arg Leu Val Lys Leu Asn Asp Glu Glu Gly Glu Ile Val Ala Ile
465   470   475   480

Lys Gly Ser Thr Leu Ser Gly Ile Tyr Tyr Glu Val Asp Thr Glu Thr
            485   490   495

Gly Tyr Glu Ile Leu Ser Arg Arg Val Phe Arg Thr Glu Tyr Asn Glu

```
                  500                  505                  510


Lys Ile Tyr Trp Thr Arg Gly Gly Gly Leu Lys Gly Gly Gln Pro Phe
        515              520              525


Asn Phe Glu Gly Leu Asp Ile Pro Val Tyr Phe Ile Asp Lys Pro Tyr
    530              535              540


Ser Glu Leu Ala Ser Ser Val Glu Leu Ser Phe Val Asn Asp Asp Ser
545              550              555              560


Pro Leu Leu Phe Pro Glu Met Asp Ser Arg Leu Pro Lys Pro Thr Pro
            565              570              575


Glu Leu Asp Ile Lys Tyr Tyr Ser Ser Asn Leu Ser Ser Phe Lys Glu
            580              585              590


Asp Thr Val Ile Leu Met Arg Gly Thr Thr Glu Glu Glu Ala Trp Asn
        595              600              605


Ile Ala Asn Tyr Lys Thr Ala Gly Gly Ser Asn Lys Asp Leu Glu Glu
    610              615              620


Asn Phe Ile Glu Ala Gly Pro Gln Phe Asn Leu Ser Phe Ser Glu Tyr
625              630              635              640


Thr Ser Ser Ile Asn Ser Ala Asp Thr Ala Ser Arg Lys His Phe Leu
            645              650              655


Val Ile Ile Lys Val Gln Val Lys Tyr Ile Ser Asn Asp Asn Val Leu
            660              665              670


Tyr Ala Asn His Trp Ala Ile Pro Asp Glu Ala Pro Val Glu Val Leu
        675              680              685


Ala Val Val Asp Arg Arg Phe Ile Phe Pro Glu Pro Pro Val Lys Pro
    690              695              700


Lys Leu Ser Phe Ile Gln Lys Ile Ala Asn Arg Phe Leu Thr Glu Asn
705              710              715              720


Val Ala Glu Ile Ser Ser Ile Asn Phe Arg Arg Leu Asn Ser Gly Asn
            725              730              735


Ile Asn Val Leu Lys Gly Arg Gly Val Phe Ser Ser Arg Arg Leu Arg
        740              745              750
```

```
Glu Ile Tyr Leu Arg Phe Asp Ala Ala Asn Ala Asp Glu Leu Arg Pro
        755          760          765

Gly Asp Val Tyr Val Lys Lys Thr Lys Phe Asp Ser Met Gly Tyr Asp
        770          775          780

Ser His Phe Tyr Asn Glu Gly Ile Gly Ile Asn Gly Ala Pro Thr Leu
785              790          795              800

Asn Thr Tyr Thr Gly Glu Tyr Val Ala Asp Ser Ser Ser Gln Gly Ala
            805          810          815

Thr Tyr Trp Leu Lys Tyr Asn Leu Thr Asn Glu Thr Ser Ile Ile Lys
        820          825          830

Val Ser Asn Ser Ala Arg Gly Ala Asn Gly Ile Lys Ile Ala Leu Glu
        835          840          845

Glu Ile Glu Glu Asn Lys Pro Val Val Ile Thr Ser Gly Thr Leu Thr
    850          855          860

Gly Cys Thr Val Val Phe Ala Arg Lys Gly Glu Tyr Phe Tyr Ala Val
865          870          875              880

His Thr Gly Asn Ser Glu Ser Leu Ile Gly Phe Thr Ser Thr Ser Gly
            885          890          895

Val Ala Lys Ala Ile Glu Val Leu Ser Ser Leu Ser Glu Leu Glu Val
        900          905          910

Pro Ala Leu Pro Asp Val Ile Asn Asn Asn Thr Leu Val Glu Tyr Leu
        915          920          925

Ser Asp Asn Phe Asp Ser Ala Leu Ile Ser Tyr Ser Ser Ser Ser Leu
    930          935          940

Lys Pro Asn Ser Met Ile Asn Ile Ser Arg Glu Asn Val Ser Thr Phe
945              950          955              960

Ser Tyr Tyr Thr Asp Asp Ile Gln Leu Pro Ser Phe Gly Thr Ser Val
            965          970              975

Thr Ile Leu Val Arg Thr Asn Asp Asn Thr Val Val Arg Ser Leu Ser
        980          985          990
```

CONFIRMATION COPY

```
Glu Ser Tyr Thr Met Asn Ser Asn  Ser Ser Lys Met Val  Val Phe Asn
        995                 1000              1005
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```
Val Leu  Gln Lys Asp Phe
    1010
```

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<210>  4
<211>  1451
<212>  PRT
<213>  Bordetella pertussis
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<400>  4
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Met Ala Leu Val Gly Tyr Asp Gly Val Val Glu Glu Leu Leu Ala Leu
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```
Pro Ser Glu Glu Ser Gly Asp Leu Ala Gly Gly Arg Ala Lys Arg Glu
            20              25              30
```

```
Lys Ala Glu Phe Ala Leu Phe Ser Glu Ala Pro Asn Gly Asp Glu Pro
        35              40              45
```

```
Ile Gly Gln Asp Ala Arg Thr Trp Phe Tyr Phe Pro Lys Tyr Arg Pro
    50              55              60
```

```
Val Ala Val Ser Asn Leu Lys Lys Met Gln Val Ala Ile Arg Ala Arg
65              70              75              80
```

```
Leu Glu Pro Glu Ser Leu Ile Leu Gln Trp Leu Ile Ala Leu Asp Val
            85              90              95
```

```
Tyr Leu Gly Val Leu Ile Ala Ala Leu Ser Arg Thr Val Ile Ser Asp
            100             105             110
```

```
Leu Val Phe Glu Tyr Val Lys Ala Arg Tyr Glu Ile Tyr Tyr Leu Leu
        115             120             125
```

```
Asn Arg Val Pro His Pro Leu Ala Thr Ala Tyr Leu Lys Arg Arg Arg
    130             135             140
```

```
Gln Arg Pro Val Asp Arg Ser Gly Arg Leu Gly Ser Val Phe Glu His
145             150             155             160
```

```
Pro Leu Trp Phe Ala Tyr Asp Glu Leu Ala Gly Thr Val Asp Leu Asp
            165             170             175
```

```
Ala Asp Ile Tyr Glu Gln Ala Leu Ala Glu Ser Ile Glu Arg Arg Met
```

```
                    180                185                190

        Asp Gly Glu Pro Asp Asp Gly Ser Leu Asp Thr Ala Glu His Asp Val
                195                200                205


        Trp Arg Leu Cys Arg Asp Gly Ile Asn Arg Gly Glu Gln Ala Ile Phe
            210                215                220


        Gln Ala Ser Gly Pro Tyr Gly Val Val Ala Asp Ala Gly Tyr Met Arg
        225                230                235                240


        Thr Val Ala Asp Leu Ala Tyr Ala Asp Ala Leu Ala Asp Cys Leu His
                    245                250                255


        Ala Gln Leu Arg Ile Arg Ala Gln Gly Ser Val Asp Ser Pro Gly Asp
                260                265                270


        Glu Met Pro Arg Lys Leu Asp Ala Trp Glu Ile Ala Lys Phe His Leu
                275                280                285


        Ala Ala Thr Gln Gln Ala Arg Val Asp Leu Leu Glu Ala Ala Phe Ala
        290                295                300


        Leu Asp Tyr Ala Ala Leu Arg Asp Val Arg Val Tyr Gly Asp Tyr Arg
        305                310                315                320


        Asn Ala Leu Ala Leu Arg Phe Ile Lys Arg Glu Ala Leu Arg Leu Leu
                    325                330                335


        Gly Ala Arg Arg Gly Asn Ala Ser Thr Met Pro Ala Val Ala Ala Gly
                340                345                350


        Glu Tyr Asp Glu Ile Val Ala Ser Gly Ala Ala Asn Asp Ala Ala Tyr
                355                360                365


        Val Ser Met Ala Ala Ala Leu Ile Ala Gly Val Leu Cys Asp Leu Glu
        370                375                380


        Ser Ala Gln Arg Thr Leu Pro Val Val Leu Ala Arg Phe Arg Pro Leu
        385                390                395                400


        Gly Val Leu Ala Arg Phe Arg Arg Leu Glu Gln Glu Thr Ala Gly Met
                405                410                415


        Leu Leu Gly Asp Gln Glu Pro Glu Pro Arg Gly Phe Ile Ser Phe Thr
                420                425                430
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```
Asp Phe Arg Asp Ser Asp Ala Phe Ala Ser Tyr Ala Glu Tyr Ala Ala
        435              440          445

Gln Phe Asn Asp Tyr Ile Asp Gln Tyr Ser Ile Leu Glu Ala Gln Arg
    450          455          460

Leu Ala Arg Ile Leu Ala Leu Gly Ser Arg Met Thr Val Asp Gln Trp
465          470          475                  480

Cys Leu Pro Leu Gln Lys Val Arg His Tyr Lys Val Leu Thr Ser Gln
            485          490              495

Pro Gly Leu Ile Ala Arg Gly Ile Glu Asn His Asn Arg Gly Ile Glu
        500          505              510

Tyr Cys Leu Gly Arg Pro Pro Leu Thr Asp Leu Pro Gly Leu Phe Thr
        515          520          525

Met Phe Gln Leu His Asp Ser Ser Trp Leu Leu Val Ser Asn Ile Asn
    530          535          540

Gly Glu Leu Trp Ser Asp Val Leu Ala Asn Ala Glu Val Met Gln Asn
545          550          555              560

Pro Thr Leu Ala Ala Leu Ala Glu Pro Gln Gly Arg Phe Arg Thr Gly
            565          570          575

Arg Arg Thr Gly Gly Trp Phe Leu Gly Gly Pro Ala Thr Glu Gly Pro
        580          585          590

Ser Leu Arg Asp Asn Tyr Leu Leu Lys Leu Arg Gln Ser Asn Pro Gly
        595          600          605

Leu Asp Val Lys Lys Cys Trp Tyr Phe Gly Tyr Arg Gln Glu Tyr Arg
    610          615          620

Leu Pro Ala Gly Ala Leu Gly Val Pro Leu Phe Ala Val Ser Val Ala
625          630          635              640

Leu Arg His Ser Leu Asp Asp Leu Ala Ala His Ala Lys Ser Ala Leu
            645          650              655

Tyr Lys Pro Ser Glu Trp Gln Lys Phe Ala Phe Trp Ile Val Pro Phe
        660          665              670
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```
Tyr Arg Glu Ile Phe Phe Ser Thr Gln Asp Arg Ser Tyr Arg Val Asp
        675              680          685

Val Gly Ser Ile Val Phe Asp Ser Ile Ser Leu Leu Ala Ser Val Phe
        690          695              700

Ser Ile Gly Gly Lys Leu Gly Ser Phe Thr Arg Thr Gln Tyr Gly Asn
705              710          715              720

Leu Arg Asn Phe Val Val Arg Gln Arg Ile Ala Gly Leu Ser Gly Gln
            725          730              735

Arg Leu Trp Arg Ser Val Leu Lys Glu Leu Pro Ala Leu Ile Gly Ala
            740          745              750

Ser Gly Leu Arg Leu Ser Arg Ser Leu Leu Val Asp Leu Tyr Glu Ile
            755          760              765

Phe Glu Pro Val Pro Ile Arg Arg Leu Val Ala Gly Phe Val Ser Ala
        770          775          780

Thr Thr Val Gly Gly Arg Asn Gln Ala Phe Leu Arg Gln Ala Phe Ser
785              790          795              800

Ala Ala Ser Ser Ser Ala Gly Arg Thr Gly Gly Gln Leu Ala Ser Glu
            805          810              815

Trp Arg Met Ala Gly Val Asp Ala Thr Gly Leu Val Glu Ser Thr Ser
            820          825              830

Gly Gly Arg Phe Glu Gly Ile Tyr Thr Arg Gly Leu Gly Pro Leu Ser
            835          840          845

Glu Cys Thr Glu His Phe Ile Val Glu Ser Gly Asn Ala Tyr Arg Val
        850          855          860

Ile Trp Asp Ala Tyr Thr His Gly Trp Arg Val Val Asn Gly Arg Leu
865          870          875              880

Pro Pro Arg Leu Thr Tyr Thr Val Pro Val Arg Leu Asn Gly Gln Gly
            885          890              895

His Trp Glu Thr His Leu Asp Val Pro Gly Arg Gly Gly Ala Pro Glu
        900          905          910
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Ile Phe Gly Arg Ile Arg Thr Arg Asn Leu Val Ala Leu Ala Ala Glu
        915                 920             925

Gln Ala Ala Pro Met Arg Arg Leu Leu Asn Gln Ala Arg Arg Val Ala
        930                 935             940

Leu Arg His Ile Asp Thr Cys Arg Ser Arg Leu Ala Leu Pro Arg Ala
945                 950             955                 960

Glu Ser Asp Met Asp Ala Ala Ile Arg Ile Phe Phe Gly Glu Pro Asp
                965             970             975

Ala Gly Leu Arg Gln Arg Ile Gly Arg Arg Leu Gln Glu Val Arg Ala
            980             985             990

Tyr Ile Gly Asp Leu Ser Pro Val Asn Asp Val Leu Tyr Arg Ala Gly
        995             1000            1005

Tyr Asp Leu Asp Asp Val Ala Thr Leu Phe Asn Ala Val Asp Arg
    1010            1015            1020

Asn Thr Ser Leu Gly Arg Gln Ala Arg Met Glu Leu Tyr Leu Asp
    1025            1030            1035

Ala Ile Val Asp Leu His Ala Arg Leu Gly Tyr Glu Asn Ala Arg
    1040            1045            1050

Phe Val Asp Leu Met Ala Phe His Leu Leu Ser Leu Gly His Ala
    1055            1060            1065

Ala Thr Ala Ser Glu Val Val Glu Ala Val Ser Pro Arg Leu Leu
    1070            1075            1080

Gly Asn Val Phe Asp Ile Ser Asn Val Ala Gln Leu Glu Arg Gly
    1085            1090            1095

Ile Gly Asn Pro Ala Ser Thr Gly Leu Phe Val Met Leu Gly Ala
    1100            1105            1110

Tyr Ser Glu Ser Ser Pro Ala Ile Phe Gln Ser Phe Val Asn Asp
    1115            1120            1125

Ile Phe Pro Ala Trp Arg Gln Ala Ser Gly Gly Gly Pro Leu Val
    1130            1135            1140

Trp Asn Phe Gly Pro Ala Ala Ile Ser Pro Thr Arg Leu Asp Tyr
```

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            1145                1150                1155


Ala Asn Thr Asp Ile Gly Leu  Leu Asn His Gly Asp  Ile Ser Pro
    1160                1165                1170


Leu Arg Ala Arg Pro Pro Leu  Gly Gly Arg Arg Asp  Ile Asp Leu
    1175                1180                1185


Pro Pro Gly Leu Asp Ile Ser  Phe Val Arg Tyr Asp  Arg Pro Val
    1190                1195                1200


Arg Met Ser Ala Pro Arg Ala  Leu Asp Ala Ser Val  Phe Arg Pro
    1205                1210                1215


Val Asp Gly Pro Val His Gly  Tyr Ile Gln Ser Trp  Thr Gly Ala
    1220                1225                1230


Glu Ile Glu Tyr Ala Tyr Gly  Ala Pro Ala Ala Ala  Arg Glu Val
    1235                1240                1245


Met Leu Thr Asp Asn Val Arg  Ile Ile Ser Ile Glu  Asn Gly Asp
    1250                1255                1260


Glu Gly Ala Ile Gly Val Arg  Val Arg Leu Asp Thr  Val Pro Val
    1265                1270                1275


Ala Thr Pro Leu Ile Leu Thr  Gly Gly Ser Leu Ser  Gly Cys Thr
    1280                1285                1290


Thr Met Val Gly Val Lys Glu  Gly Tyr Leu Ala Phe  Tyr His Thr
    1295                1300                1305


Gly Lys Ser Thr Glu Leu Gly  Asp Trp Ala Thr Ala  Arg Glu Gly
    1310                1315                1320


Val Gln Ala Leu Tyr Gln Ala  His Leu Ala Met Gly  Tyr Ala Pro
    1325                1330                1335


Ile Ser Ile Pro Ala Pro Met  Arg Asn Asp Asp Leu  Val Ser Ile
    1340                1345                1350


Ala Ala Thr Tyr Asp Arg Ala  Val Ile Ala Tyr Leu  Gly Lys Asp
    1355                1360                1365


Val Pro Gly Gly Gly Ser Thr  Arg Ile Thr Arg His  Asp Glu Gly
    1370                1375                1380
```

Ala Gly Ser Val Val Ser Phe Asp Tyr Asn Ala Ala Val Gln Ala
    1385   1390   1395

Ser Ala Val Pro Arg Leu Gly Gln Val Tyr Val Leu Ile Ser Asn
    1400   1405   1410

Asp Gly Gln Gly Ala Arg Ala Val Leu Leu Ala Glu Asp Leu Ala
    1415   1420   1425

Trp Ala Gly Ser Gly Ser Ala Leu Asp Val Leu Asn Glu Arg Leu
    1430   1435   1440

Val Thr Leu Phe Pro Ala Pro Val
    1445   1450

<210> 5
<211> 240
<212> PRT
<213> Salmonella typhimurium

<400> 5

Met Thr Lys Ile Thr Leu Ser Pro Gln Asn Phe Arg Ile Gln Lys Gln
1   5   10   15

Glu Thr Thr Leu Leu Lys Glu Lys Ser Thr Glu Lys Asn Ser Leu Ala
        20   25   30

Lys Ser Ile Leu Ala Val Lys Asn His Phe Ile Glu Leu Arg Ser Lys
        35   40   45

Leu Ser Glu Arg Phe Ile Ser His Lys Asn Thr Glu Ser Ser Ala Thr
    50   55   60

His Phe His Arg Gly Ser Ala Ser Glu Gly Arg Ala Val Leu Thr Asn
65   70   75   80

Lys Val Val Lys Asp Phe Met Leu Gln Thr Leu Asn Asp Ile Asp Ile
            85   90   95

Arg Gly Ser Ala Ser Lys Asp Pro Ala Tyr Ala Ser Gln Thr Arg Glu
            100   105   110

Ala Ile Leu Ser Ala Val Tyr Ser Lys Asn Lys Asp Gln Cys Cys Asn
        115   120   125

Leu Leu Ile Ser Lys Gly Ile Asn Ile Ala Pro Phe Leu Gln Glu Ile
    130   135   140

Gly Glu Ala Ala Lys Asn Ala Gly Leu Pro Gly Thr Thr Lys Asn Asp
145   150   155   160

Val Phe Thr Pro Ser Gly Ala Gly Ala Asn Pro Phe Ile Thr Pro Leu
            165   170   175

Ile Ser Ser Ala Asn Ser Lys Tyr Pro Arg Met Phe Ile Asn Gln His
            180   185   190

Gln Gln Ala Ser Phe Lys Ile Tyr Ala Glu Lys Ile Ile Met Thr Glu
            195   200   205

Val Ala Pro Leu Phe Asn Glu Cys Ala Met Pro Thr Pro Gln Gln Phe
    210   215   220

Gln Leu Ile Leu Glu Asn Ile Ala Asn Lys Tyr Ile Gln Tyr Thr Pro
225   230   235   240

<210> 6
<211> 240
<212> PRT
<213> Salmonella typhimurium

<400> 6

Met Thr Asn Ile Thr Leu Ser Thr Gln His Tyr Arg Ile His Arg Ser
1   5   10   15

Asp Val Glu Pro Val Lys Glu Lys Thr Thr Glu Lys Asp Ile Phe Ala
            20   25   30

Lys Ser Ile Thr Ala Val Arg Asn Ser Phe Ile Ser Leu Ser Thr Ser
            35   40   45

Leu Ser Asp Arg Phe Ser Leu His Gln Gln Thr Asp Ile Pro Thr Thr
    50   55   60

His Phe His Arg Gly Asn Ala Ser Glu Gly Arg Ala Val Leu Thr Ser
65   70   75   80

Lys Thr Val Lys Asp Phe Met Leu Gln Lys Leu Asn Ser Leu Asp Ile
            85   90   95

Lys Gly Asn Ala Ser Lys Asp Pro Ala Tyr Ala Arg Gln Thr Cys Glu
            100   105   110

```
Ala Ile Leu Ser Ala Val Tyr Ser Asn Asn Lys Asp Gln Cys Cys Lys
        115                 120                 125

Leu Leu Ile Ser Lys Gly Val Ser Ile Thr Pro Phe Leu Lys Glu Ile
        130                 135                 140

Gly Glu Ala Ala Gln Asn Ala Gly Leu Pro Gly Glu Ile Lys Asn Gly
145                 150                 155                 160

Val Phe Thr Pro Gly Gly Ala Gly Ala Asn Pro Phe Val Val Pro Leu
                165                 170                 175

Ile Ala Ser Ala Ser Ile Lys Tyr Pro His Met Phe Ile Asn His Asn
            180                 185                 190

Gln Gln Val Ser Phe Lys Ala Tyr Ala Glu Lys Ile Val Met Lys Glu
        195                 200                 205

Val Thr Pro Leu Phe Asn Lys Gly Thr Met Pro Thr Pro Gln Gln Phe
        210                 215                 220

Gln Leu Thr Ile Glu Asn Ile Ala Asn Lys Tyr Leu Gln Asn Ala Ser
225                 230                 235                 240


<210> 7
<211> 166
<212> PRT
<213> Shigella flexneri

<400> 7

Met Glu Ile Gln Asn Thr Lys Ser Ala Pro Ile Leu Tyr Thr Asp Ile
1               5                   10                  15

Ser Thr Lys Gln Thr Gln Ser Ser Ser Glu Thr Gln Lys Ser Gln Asn
            20                  25                  30

Tyr Gln Gln Leu Ala Ala His Ile Pro Leu Asn Val Gly Lys Asn Pro
        35                  40                  45

Val Leu Thr Thr Thr Leu Asn Asp Asp Gln Leu Leu Lys Leu Ser Glu
        50                  55                  60

Gln Val Gln His Asp Ser Glu Ile Ile Ala Arg Leu Thr Asp Lys Lys
65                  70                  75                  80
```

```
Met Lys Asp Leu Ser Glu Met Ser His Thr Ile Thr Pro Glu Asn Thr
                85                  90                  95

Leu Asp Ile Ser Ser Leu Ser Ser Asn Ala Val Ser Leu Ile Ile Ser
               100                 105                 110

Val Ala Val Leu Leu Ser Ala Leu Arg Thr Ala Glu Thr Arg Leu Gly
        115                 120                 125

Ser Gln Leu Ser Leu Ile Ala Phe Asp Ala Thr Lys Ser Ala Ala Glu
        130                 135                 140

Asn Ile Val Arg Gln Gly Leu Ala Ala Leu Ser Ser Ser Ile Thr Gly
145                 150                 155                 160

Ala Val Thr Gln Val Gly
                165


<210> 8
<211> 1186
<212> PRT
<213> Helicobacter pylori

<400> 8

Met Thr Asn Glu Thr Ile Asp Gln Thr Arg Thr Pro Asp Gln Thr Gln
1               5                   10                  15

Ser Gln Thr Ala Phe Asp Pro Gln Gln Phe Ile Asn Asn Leu Gln Val
            20                  25                  30

Ala Phe Ile Lys Val Asp Asn Val Val Ala Ser Phe Asp Pro Asp Gln
        35                  40                  45

Lys Pro Ile Val Asp Lys Asn Asp Arg Asp Asn Arg Gln Ala Phe Asp
    50                  55                  60

Gly Ile Ser Gln Leu Arg Glu Glu Tyr Ser Asn Lys Ala Ile Lys Asn
65                  70                  75                  80

Pro Thr Lys Lys Asn Gln Tyr Phe Ser Asp Phe Ile Asp Lys Ser Asn
                85                  90                  95

Asp Leu Ile Asn Lys Asp Asn Leu Ile Asp Val Glu Ser Ser Thr Lys
               100                 105                 110

Ser Phe Gln Lys Phe Gly Asp Gln Arg Tyr Gln Ile Phe Thr Ser Trp
        115                 120                 125
```

```
Val Ser His Gln Lys Asp Pro Ser Lys Ile Asn Thr Arg Ser Ile Arg
    130             135             140

Asn Phe Met Glu Asn Ile Ile Gln Pro Pro Ile Pro Asp Asp Lys Glu
145             150             155             160

Lys Ala Glu Phe Leu Lys Ser Ala Lys Gln Ser Phe Ala Gly Ile Ile
            165             170             175

Ile Gly Asn Gln Ile Arg Thr Asp Gln Lys Phe Met Gly Val Phe Asp
            180             185             190

Glu Ser Leu Lys Glu Arg Gln Glu Ala Glu Lys Asn Gly Gly Pro Thr
        195             200             205

Gly Gly Asp Trp Leu Asp Ile Phe Leu Ser Phe Ile Phe Asn Lys Lys
    210             215             220

Gln Ser Ser Asp Val Lys Glu Ala Ile Asn Gln Glu Pro Val Pro His
225             230             235             240

Val Gln Pro Asp Ile Ala Thr Thr Thr Thr Asp Ile Gln Gly Leu Pro
            245             250             255

Pro Glu Ala Arg Asp Leu Leu Asp Glu Arg Gly Asn Phe Ser Lys Phe
            260             265             270

Thr Leu Gly Asp Met Glu Met Leu Asp Val Glu Gly Val Ala Asp Ile
    275             280             285

Asp Pro Asn Tyr Lys Phe Asn Gln Leu Leu Ile His Asn Asn Ala Leu
    290             295             300

Ser Ser Val Leu Met Gly Ser His Asn Gly Ile Glu Pro Glu Lys Val
305             310             315             320

Ser Leu Leu Tyr Ala Gly Asn Gly Gly Phe Gly Asp Lys His Asp Trp
            325             330             335

Asn Ala Thr Val Gly Tyr Lys Asp Gln Gln Gly Asn Asn Val Ala Thr
            340             345             350

Leu Ile Asn Val His Met Lys Asn Gly Ser Gly Leu Val Ile Ala Gly
            355             360             365
```

Gly Glu Lys Gly Ile Asn Asn Pro Ser Phe Tyr Leu Tyr Lys Glu Asp
    370   375   380

Gln Leu Thr Gly Ser Gln Arg Ala Leu Ser Gln Glu Glu Ile Arg Asn
385   390   395   400

Lys Val Asp Phe Met Glu Phe Leu Ala Gln Asn Asn Thr Lys Leu Asp
            405   410   415

Asn Leu Ser Glu Lys Glu Lys Glu Lys Phe Gln Asn Glu Ile Glu Asp
        420   425   430

Phe Gln Lys Asp Ser Lys Ala Tyr Leu Asp Ala Leu Gly Asn Asp Arg
        435   440   445

Ile Ala Phe Val Ser Lys Lys Asp Thr Lys His Ser Ala Leu Ile Thr
    450   455   460

Glu Phe Asn Asn Gly Asp Leu Ser Tyr Thr Leu Lys Asp Tyr Gly Lys
465   470   475   480

Lys Ala Asp Lys Ala Leu Asp Arg Glu Lys Asn Val Thr Leu Gln Gly
            485   490   495

Ser Leu Lys His Asp Gly Val Met Phe Val Asp Tyr Ser Asn Phe Lys
        500   505   510

Tyr Thr Asn Ala Ser Lys Asn Pro Asn Lys Gly Val Gly Ala Thr Asn
    515   520   525

Gly Val Ser His Leu Glu Ala Gly Phe Asn Lys Val Ala Val Phe Asn
    530   535   540

Leu Pro Asp Leu Asn Asn Leu Ala Ile Thr Ser Phe Val Arg Arg Asn
545   550   555   560

Leu Glu Asn Lys Leu Thr Ala Lys Gly Leu Ser Leu Gln Glu Ala Asn
            565   570   575

Lys Leu Ile Lys Asp Phe Leu Ser Ser Asn Lys Glu Leu Ala Gly Lys
            580   585   590

Ala Leu Asn Phe Asn Lys Ala Val Ala Glu Ala Lys Ser Thr Gly Asn
    595   600   605

```
Tyr Asp Glu Val Lys Lys Ala Gln Lys Asp Leu Glu Lys Ser Leu Arg
    610             615             620

Lys Arg Glu His Leu Glu Lys Glu Val Glu Lys Lys Leu Glu Ser Lys
625             630             635             640

Ser Gly Asn Lys Asn Lys Met Glu Ala Lys Ala Gln Ala Asn Ser Gln
                645             650             655

Lys Asp Glu Ile Phe Ala Leu Ile Asn Lys Glu Ala Asn Arg Asp Ala
                660             665             670

Arg Ala Ile Ala Tyr Thr Gln Asn Leu Lys Gly Ile Lys Arg Glu Leu
            675             680             685

Ser Asp Lys Leu Glu Lys Ile Ser Lys Asp Leu Lys Asp Phe Ser Lys
    690             695             700

Ser Phe Asp Glu Phe Lys Asn Gly Lys Asn Lys Asp Phe Ser Lys Ala
705             710             715             720

Glu Glu Thr Leu Lys Ala Leu Lys Gly Ser Val Lys Asp Leu Gly Ile
            725             730             735

Asn Pro Glu Trp Ile Ser Lys Val Glu Asn Leu Asn Ala Ala Leu Asn
            740             745             750

Glu Phe Lys Asn Gly Lys Asn Lys Asp Phe Ser Lys Val Thr Gln Ala
    755             760             765

Lys Ser Asp Leu Glu Asn Ser Val Lys Asp Val Ile Ile Asn Gln Lys
    770             775             780

Val Thr Asp Lys Val Asp Asn Leu Asn Gln Ala Val Ser Val Ala Lys
785             790             795             800

Ala Met Gly Asp Phe Ser Arg Val Glu Gln Val Leu Ala Asp Leu Lys
                805             810             815

Asn Phe Ser Lys Glu Gln Leu Ala Gln Gln Ala Gln Lys Asn Glu Asp
        820             825             830

Phe Asn Thr Gly Lys Asn Ser Glu Leu Tyr Gln Ser Val Lys Asn Ser
        835             840             845

Val Asn Lys Thr Leu Val Gly Asn Gly Leu Ser Gly Ile Glu Ala Thr
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                  850                    855                      860

Ala Leu Ala Lys Asn Phe Ser Asp Ile Lys Lys Glu Leu Asn Glu Lys
865                 870                  875                    880


Phe Lys Asn Phe Asn Asn Asn Asn Gly Leu Lys Asn Ser Thr Glu
                885                  890.                  895


Pro Ile Tyr Ala Lys Val Asn Lys Lys Lys Thr Gly Gln Val Ala Ser
            900                  905                  910


Pro Glu Glu Pro Ile Tyr Thr Gln Val Ala Lys Lys Val Asn Ala Lys
            915                  920                  925


Ile Asp Arg Leu Asn Gln Ile Ala Ser Gly Leu Gly Gly Val Gly Gln
    930                  935                  940


Ala Ala Gly Phe Pro Leu Lys Arg His Asp Lys Val Asp Asp Leu Ser
945                 950                  955                    960


Lys Val Gly Leu Ser Ala Ser Pro Glu Pro Ile Tyr Ala Thr Ile Asp
                965                  970                  975


Asp Leu Gly Gly Pro Phe Pro Leu Lys Arg His Asp Lys Val Asp Asp
            980                  985                  990


Leu Ser Lys Val Gly Arg Ser Arg Asn Gln Glu Leu Ala Gln Lys Ile
            995                  1000                 1005


Asp Asn Leu Asn Gln Ala Val Ser Glu Ala Lys Ala Gly Phe Phe
    1010                 1015                 1020


Gly Asn Leu Glu Gln Thr Ile Asp Lys Leu Lys Asp Ser Thr Lys
    1025                 1030                 1035


Lys Asn Val Met Asn Leu Tyr Val Glu Ser Ala Lys Lys Val Pro
    1040                 1045                 1050


Ala Ser Leu Ser Ala Lys Leu Asp Asn Tyr Ala Ile Asn Ser His
    1055                 1060                 1065


Thr Arg Ile Asn Ser Asn Ile Gln Asn Gly Ala Ile Asn Glu Lys
    1070                 1075                 1080


Ala Thr Gly Met Leu Thr Gln Lys Asn Pro Glu Trp Leu Lys Leu
    1085                 1090                 1095
```

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Val Asn  Asp Lys Ile Val Ala  His Asn Val Gly Ser  Val Ser Leu
    1100             1105             1110


Ser Glu  Tyr Asp Lys Ile Gly  Phe Asn Gln Lys Asn  Met Lys Asp
    1115             1120             1125


Tyr Ser  Asp Ser Phe Lys Phe  Ser Thr Lys Leu Asn  Asn Ala Val
    1130             1135             1140


Lys Asp  Ile Lys Ser Gly Phe  Thr His Phe Leu Ala  Asn Ala Phe
    1145             1150             1155


Ser Thr  Gly Tyr Tyr Cys Leu  Ala Arg Glu Asn Ala  Glu His Gly
    1160             1165             1170


Ile Lys  Asn Val Asn Thr Lys  Gly Gly Phe Gln Lys  Ser
    1175             1180             1185



<210> 9
<211> 201
<212> PRT
<213> Homo sapiens

<400> 9

Ser Ser Gly Pro Ser Ser Ser Leu Asp Asn Gly Asn Ser Leu Asp Val
1         5             10             15


Leu Lys Asn His Val Leu Asn Glu Leu Ile Gln Thr Glu Arg Val Tyr
        20             25             30


Val Arg Glu Leu Tyr Thr Val Leu Leu Gly Tyr Arg Ala Glu Met Asp
        35             40             45


Asn Pro Glu Met Phe Asp Leu Met Pro Pro Leu Leu Arg Asn Lys Lys
    50             55             60


Asp Ile Leu Phe Gly Asn Met Ala Glu Ile Tyr Glu Phe His Asn Asp
65             70             75             80


Ile Phe Leu Ser Ser Leu Glu Asn Cys Ala His Ala Pro Glu Arg Val
            85             90             95


Gly Pro Cys Phe Leu Glu Arg Lys Asp Asp Phe Gln Met Tyr Ala Lys
        100             105             110
```

Tyr Cys Gln Asn Lys Pro Arg Ser Glu Thr Ile Trp Arg Lys Tyr Ser
        115   120   125

Glu Cys Ala Phe Phe Gln Glu Cys Gln Arg Lys Leu Lys His Arg Leu
    130   135   140

Arg Leu Asp Ser Tyr Leu Leu Lys Pro Val Gln Arg Ile Thr Lys Tyr
145   150   155   160

Gln Leu Leu Leu Lys Glu Leu Leu Lys Tyr Ser Lys Asp Cys Glu Gly
                165   170   175

Ser Ala Leu Leu Lys Lys Ala Leu Asp Ala Met Leu Asp Leu Leu Lys
            180   185   190

Ser Val Asn Asp Ser Met His Gln Ile
        195   200